

10/566208

IP20 Rec'd PCT/PTO 27 JAN 2006

PCT/BR2003/000109

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**ANNEXES TO THE
PRELIMINARY EXAMINATION REPORT
(ARTICLE 34 AMENDMENTS)**

**Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

Sir:

REQUEST FOR SUBSTITUTION OF REPLACEMENT SHEETS

Please substitute the attached replacement pages 2, 2a, 2b, 3, 3a, 4, 4a, 5, 5a, 6, 6a, 7, 7a, 8, 8a, 9, 9a, 10, 10a, 11, and 11a, of the Article 34 Amendments for pages 2-11 of the specification in the enclosed as-filed PCT application. Also please substitute the attached replacement pages 12 and 13 the claims of the Article 34 amendments for pages 12 and 13 of the claims in the enclosed as-filed PCT Application. It is respectfully requested that the replacement pages 2, 2a, 2b, 3, 3a, 4, 4a, 5, 5a, 6, 6a, 7, 7a, 8, 8a, 9, 9a, 10, 10a, 11, and 11a, and the claims on replacement pages 12 and 13 be examined during examination of the patent application. Claims 1-14 are currently pending.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
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Dated: January 27, 2006

By: 

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EFC/FPD/gah

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tance pump that uses cuffs for blocking the aorta and the coronary arteries in diastole. According to that patent, the passageway for blood from the aorta is kept opened by means of a system of two cuffs that are sequentially inflated and deflated, the sequence being determined by signals from an electrocardiogram apparatus, which are used as commands for sequentially inflating and deflating the two cuffs for the purpose of never interrupting the flow of blood in the aorta, which would obviously cause the death of the patient. This solution, however, besides being specific for use in the aorta, is of technically complex construction, needing two cuffs and, chiefly, imposing an artificial rhythm of opening and closing the blood-circulation passageway, which is undesirable from the physiological point of view.

US Pat. 4,791,923 deals with a tracheal probe composed of an outer cuff and an inner cuff, the latter being located inside the outer cuff, said cuffs being non-physiologically inflated by conduits. Since they are very thin, they only work under high pressure; besides, these cuffs do not inflate, if they are connected to the lumen of the tube. This probe has the purpose of sealing the trachea completely with the outer cuff during inspiration and expiration in pressure peaks, without letting the gases leak. However, due to the elasticity of the trachea and its consequent dilatation, the inflated gases leak.

EP-A-0,766,976 describes a probe with only a suction system that only sucks the interior of the tube. This probe prevents contamination and respiratory problems during the suctions, as well as carries out these suctions uninterruptedly. Since it has an internal cannula for uninterrupted suction, the probe lumen is reduced. Said probe dispenses with the use of a connector with the Y for introduction of the suction catheter.

WO-A-99/38548 deals with a probe that has a lumen dedicated to the suction trigger for aspirating secretions from the trachea. This probe does not have a valve, or tap, for connection of the internal and external aspirations; these aspirations could be effected simultaneously or alternatively, in case the probe had a valve.

US Pat. 5,452,716 describes a tracheal tube for assisting the breathing of patients with respiratory insufficiency, as long as they are with

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their breathing under control.

Document WO-A-99/66975 describes an intratracheal ventilation catheter. In this catheter, the whole sucked air passes through the cuff, with the air flowing to the distal end of the catheter until it reaches the trachea, and the expired air is made outside the tube. In this instrument, the outlet for
5 air from the cuff is the same air inlet.

US Pat. 6,463,927 describes a guide for an endotracheal tube made from a plastic material containing a bendable rod.

FR-A-2,826,283 deals with an endotracheal medical surgical
10 probe adaptable only to the morphologies of oral regions and external segments of the patients' mouth.

Objectives of the Invention

An objective of the present invention is to prevent injuries caused by prolonged intubation of a patient with a probe provided with an inflatable cuff.
15

Another objective of the present invention is to provide more tranquillity to the physician in performing surgeries that require a longer time for intubating the patient, as well as to provide a probe suitable for facilitating intubation in emergency situations.

A further objective of the present invention is to prevent possible injuries caused by inserting the metallic thread into the tube in order to conform the probe.
20

The invention has also the objective of preventing the use of a pharyngoscope.

A further objective of the present invention is to prevent the cuff from being excessively inflated, which would cause injuries to the patient.
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Another objective of the invention is to provide a probe especially for patients who remain intubated for a long time, independently of its duration.

The above-described objectives of the invention are achieved by means of the probe that will be described in greater detail later.
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Summary of the Invention

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The present invention has achieved the above-cited objectives by means of a probe for medical use, which basically consists of a tube designed for receiving blown air, and a first cuff arranged around the tube in a region of its external wall, said first cuff being inflatable by means of a first
5 conduit located at the tube wall, which account for communication of the inside of the first cuff with the inside of the tube. Thus, the insufflation of the

first cuff is commanded by the flow of air injected into the tube during the inspiratory movement, causing the probe to be fixed to the walls of the passageway of the human body that is being intubated; whereas the deflation of said first cuff takes place when the air is expelled from the patient's lung through the tube during the expiratory movement. This causes the first cuff to deflate temporarily, thus alleviating the mechanical pressure on the walls of said passageway of the human body and making blood circulation possible until a new flow of air is injected, which may come from an artificial breathing apparatus or from the normal breathing of the patient.

Thus, said first cuff is inflated during the inspiration and deflated during the expiration at the natural rhythm of the patient's respiration or artificial breathing apparatus. In this way the above-mentioned problems of the prior art are eliminated and the probe of the present invention has an ideal performance from the physiological point of view. Further, said first cuff may be inflated from a conduit that is not connected to the tube lumen, but rather to one of the legs of the Y connector, connected to the probe or else directly from a source coming from the respirator or another mechanism that follows the same cycle of the respirator.

According to a preferred embodiment of the invention, the probe further comprises means that provide the tube with an elastic memory, located on the tube wall and consisting of a guide thread made from a radiopaque flexible and malleable material. Such means simultaneously allow one to mold the probe tube and to view the probe on an X-ray photograph, for instance, besides enabling one to mold the probe, adapting its exit to the mouth, nose or tracheostomy orifice, to prevent known lesions caused by probes to lips, gums, teeth, tongue, nose wings and neighboring structures of the tracheotomies. These means having elastic memory enable a simple, rapid non-traumatic intubation, and even without laryngoscope.

According to another embodiment of the invention, the probe for medical use comprises, in addition to the tube, the first cuff and the first conduit in the tube wall that communicates the interior of the tube with the interior of the cuff, a second and a third conduits in the tube wall, which extend

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along the length of the tube and are able to be coupled to an external aspiration device.

- 5 The second conduit has bores close to an end, which provide communication of the inside of the second conduit with the inside of the tube, the other end being connectable to a suction device, thus allowing the secretions existing inside the probe tube to be sucked, which prevents the tube from being clogged. The orifices remain in the back wall of the tube 1, at a distance of 1 centimeter from each other and extend from the cuff to the distal end of the tube. Their diameters are equal to or smaller than that of the
- 10 conduit that has given rise to them.

The third conduit, on its turn, has bores close to one of its ends, which provide communication of the inside of the third conduit with the exter-

nal region of the tube, the other end being connectable to a suction device, so that the secretions existing inside the tube can also be sucked. The orifices also remain in the back wall of the tube that is related to the back wall of the trachea, have a diameter equal to or smaller than that of the conduit that
5 has given rise to them, and are in number of three in the oropharynx and three in the trachea, over the cuff 1 by one centimeter when the latter is totally inflated, and are away from each other by 1.5 centimeters.

In addition, the second and third conduits are connectable by their ends to a first 3-way connection means, coupled to the external suction
10 device and provided with a switch that permits suction at each of the conduits separately or at both conduits at the same time. In this way, depending upon the position of the switch, either the secretions existing inside the tube alone can be sucked (through the second conduit) or the secretions existing in the external region of the tube (through the third conduit), as well as the secre-
15 tions of both regions at the same time.

According to an embodiment of the present invention, the first conduit is connectable to a second 3-way connection means, provided with a switch that enables one to control the operation mode of the probe. In this way, the probe may also be used in the conventional manner, with non-
20 physiological pressure, depending upon the position of the switch. In this case, the cuff is inflated by injecting a fluid into one of the ways of the connection means and remains permanently inflated.

The probe is further provided with a second monitoring cuff, located around the first conduit, also linked to the inside of the first conduit in
25 the region close to the opening of the tube that receives air insufflation, which is inflated and deflated at the same rhythm as the inflation and deflation of the first cuff takes place. The second cuff is used for monitoring the functioning of the first cuff, since it will only be inflated if the first cuff is intact. It is used mainly as a hypertension relief valve, since the cuff is elastic and extensible,
30 absorbing any excess pressure, so that the cuff, at most, only rests against the trachea without damaging it. The trachea is more resistant than the satellite cuff. For this reason, the satellite cuff expands and even blows out in ca-

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ses of too high pressure, making impossible the barotraumas over the trachea walls.

- Another probe embodiment is also provided, the probe having two tubes coupled side by side, one of them being longer than the other, permitting selective insufflations of one lung, for example, by connecting an artificial breathing apparatus to one of the probe tubes and simultaneously inflating the first cuffs of each tube, the first cuff of the first tube being close to the bronchia, and the first cuff of the second tube being in the trachea region, surrounding the two tubes altogether. For this purpose, the air outlet of the tube cuff that is not connected to the artificial breathing apparatus should be kept closed. If, on the other hand, one wishes to effect the selective inflation of the other lung, for example, one

connects the artificial breathing apparatus to the other tube, closing the air outlet of the tube cuff that is not connected to said breathing apparatus.

Brief Description of the Drawings

Figure 1 shows a cross-section view of a first embodiment of the probe for medical use of the present invention, the figure illustrating the probe tube, the first cuff, the first conduit located at the tube wall, having an opening into the interior of the first cuff and an opening into the interior of the tube, as well as the means that provide the tube with an elastic memory, which consists of a radiopaque flexible rod in the preferred embodiment of the invention, which extends throughout the whole tube.

Figure 2 is a top view from the AA' section of the first probe embodiment illustrated in figure 1, which shows the first cuff, the first conduit, located at the tube wall along the length of the tube, and the radiopaque flexible rod.

Figure 3 shows a cross-section view of a second probe embodiment according to the present invention, the figure illustrating the probe tube, the first cuff, the first conduit located at the tube wall, having an opening into the interior of the first cuff and an opening into the interior of the tube, the radiopaque flexible rod and the second cuff, which monitors the functioning of the first cuff, and absorbs the excess pressure of the system, thus preventing hypertension in the first cuff and, consequently, tension of the first cuff in the trachea.

Figure 4 is a cross-section view of a third probe embodiment of the present invention, illustrating, in addition to the components described in figure 3 (probe tube, first cuff, first conduit located at the tube wall with an opening into the interior of the first cuff and a second opening into the interior of the tube, radiopaque flexible rod and second cuff), the connection means, which enables the probe to be used as a conventional probe, with active inflation of the first cuff by means of a syringe, or else with passive inflation of the first cuff at the moment of inspiration with the physiological pressure of the airways, the backflow of air during expiration being immediately closed, thus maintaining the first cuff permanently inflated, but with physiological

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pressure.

Figure 5 shows a cross-section view of a fourth embodiment of a probe for medical use, which illustrates the probe tube, the first cuff, the first

conduit located at the tube wall, having an opening into the interior of the first cuff and an opening into the tube, the radiopaque flexible rod, the second and third conduits, provided with bores and arranged at the tube wall, through which the secretions existing inside and outside the probe tube are sucked, the first and second connection means, as well as the second cuff for monitoring the first cuff.

Figure 6 is a top view from the BB' section of the fourth probe embodiment illustrated in figure 5, which shows the first cuff, the first conduit, the second conduit and the third conduit, located at the tube wall along the length of the tube, as well as the radiopaque flexible rod throughout the whole tube.

Figure 7 is a cross-section view showing, in detail, the second cuff, which communicates with the first conduit, which accounts for monitoring the first cuff, besides being one of the main mechanisms of protection of the trachea wall, since it prevents hypertension in the first cuff, which is elastic, distensible and has low resistance in its filling.

Figure 8 is a cross-section view of a fifth embodiment of the probe of the present invention, illustrating, in addition to the components described in figure 5 (probe tube, first cuff, first conduit, radiopaque flexible rod, second and third conduits, first and second connection means and second cuff), the detail of a portion of the first conduit that is connected to the second cuff and which is external to the tube wall and concertina, whereby its length may be adjusted if it is necessary to cut the probe or increasing it.

Figure 9 shows another embodiment of the probe for medical use with the same characteristics of the above-described embodiments, but further comprising a second tube similar to the first one, laterally coupled to the first tube, having a shorter length than the latter and a first conduit that communicates the interior of the second tube with the interior of the first cuff of the second tube, said first conduit extending as far as the inside of the first cuff of the first tube. The metallic guide remains located on the larger tube wall as far as its tip, or at the middle of the two tubes, and from this point to the tip of the larger tube.

6a

Detailed Description of the Figures

Figure 1 illustrates a first embodiment of the probe for medical use of the present invention. This first embodiment comprises a tube 1, provided with at least one opening 2 to receive air insufflations, and a first cuff 3, arranged around the tube 1 in a region of its external wall, which is inflatable

by means of a first conduit 5 arranged at the wall of the tube 1, having an opening into the interior of the first cuff 3 and another opening into the interior of the tube 1. The inflation of the first cuff 3 occurs by injecting a flow of air into the opening of the tube of the probe 2 during the inspiration, bringing about the fixation of the probe to the walls of the passageway of the human body that is being intubated and principally sealing or occluding the trachea, so that inspired air will not escape. The deflation of the first cuff 3, in turn, occurs in the period of time in which air is expelled from the patient's lungs through the probe tube 1, that is, during the expiration, providing a relief of the mechanical pressure that was being exerted by the first cuff 3 on the walls of said passageway of the human body and making blood circulation possible in this region until a new flow of air is injected into the human body. Thus, the inflation and deflation of the first cuff 3 take place following the rhythm itself of the patient's respiration (inspiration and expiration, respectively), which makes the probe physiologically ideal. It should be pointed out that the flow of air insufflated into the tube 1 of the probe may also come from an artificial breathing apparatus, on patients with mechanical ventilation or any ventilation mode, including awake patients breathing spontaneously with probe or tracheotome.

In addition, figure 1 shows the means 4 that provide the probe tube 1 with an elastic memory, located at the tube wall along the length of the tube 1. Such means 4 consist of a guide thread made from a flexible and radiopaque material, which enables one to mold the probe tube 1 and to view the probe in an X-ray photograph and to effect tracheal intubation without the use of a laryngoscope with patient's head and neck in any angulations and/or position. This prevents serious injuries to lips, gums, teeth, nose wings and tracheostomy orifices, besides molding the probe at the exit of the mouth and/or nose and /or tracheostomy orifice, or else other cannulas such as artery and vein cannulas used in heart surgeries or any other types of surgery which needs a flexible plastic tube with elastic memory.

This elastic memory imparts to the tube an important purpose: making it a first option in emergency procedures such as CRA (cardio respi-

7a

ratory arrest) and/or polytraumas and facial and cervical injuries, because it dispenses with the guide thread and the laryngoscope.

Figure 2 is a top view from the section AA' of the first probe embodiment illustrated in figure 1. In this figure, one illustrates the first cuff 3, arranged around the tube 1, and the first conduit 5, located at the tube wall along the length of the tube, which has an opening into the interior of the first cuff 3 and a second opening into the interior of the tube 1 or else into the interior of a preferably Y-shaped connector coupled to the tube 1, or else coupled to an independent source from the respirator that has a cycle in the same rhythm of the breathing or else specific equipments for inflating and deflating the cuffs, synchronically with the cycle of the respirator.

Figure 3 illustrates a second probe embodiment for medical use, which also consists of a tube 1, which will receive air insufflation; a first cuff 3, arranged around the tube 1, in a region of its external wall, said first cuff 3 being inflatable by means of the conduit 5 arranged at the tube wall, having an opening into the interior of the first cuff 3 and another opening into the

8

interior of the tube 1; and means 4 that provide the probe tube 1 with an elastic memory, located at the tube wall along the length of the tube 1. It should be pointed out that the inflation and deflation of the first cuff 3 are effected by following the procedure described above for the first probe embodiment for medical use.

The probe of this second embodiment, illustrated in figure 3, is further provided with a second cuff 16 for monitoring, which is also linked to the inside of the first conduit 5 in the region close to the opening 2 of the tube that receives air insufflation and is inflated and deflated together with the first cuff 3. The second cuff 16 monitors the functioning of the first cuff 3, and is only inflated if the first cuff 3 is intact. This satellite cuff 16 is elastic and extendable, working mainly as relief valve for any excess pressure in the tracheal and bronchial cuffs, so that the most that can happen is for the cuffs to rest against the trachea, and never press upon them; since the satellite has less resistance it will expand, absorbing the excess pressure. If the pressure is too great, the satellites will expand until they blow out and, even so, no injury will be caused to the trachea by the cuffs, which will only rest against it. This means that the trachea has much higher distension than the satellite cuffs.

Figure 4 illustrates a third probe embodiment for medical use, comprising the same elements of the probe embodiment of figure 3, described above. The inflation and deflation of the first cuff 3 is effected by the same procedure of the embodiment of the preceding figure.

In the probe embodiment of figure 4, the first conduit 5 is connected to a connection means 20, provided with a switch that enables one to control the probe operation mode. In this way, the probe may also be used in a conventional manner, with non-physiological pressure, the first cuff 3 being inflated, in this case, by insertion of a fluid and remaining permanently inflated even if it is inflated with high pressure, the one that will absorb the excess pressure is the satellite cuff and not the first cuff, that is to say, in any form of functioning there will never be hyperpressure in the cuffs against the wall of the bronchia and trachea. The probe will further be used

8a

with passive inflation of the first cuff 3 at the moment of inspiration, with the physiological pressure of the airways, the backflow of air and deflation of the first cuff 3 being prevented by closing the connection means 20. In this way, the first cuff 3 remains permanently inflated, but with physiological pressure of the airways.

Another embodiment of the probe for medical use is shown in figure 5, which also comprises a tube 1, which will receive air insufflation; a first cuff 3, arranged around the tube 1 in a region of its external wall, said first cuff 3 being inflatable through a first conduit 5 arranged at the tube wall, having an opening into the interior of the first cuff 3 and another opening into the interior of the tube 1, or from and direct source of respirator, or from Y connected to the probe or a specific equipment to inflate and deflate the cuffs with low pressure, synchronically with the cycle of the respirator. The inflation and deflation of the first cuff 3 are effected by following the same procedure described above for the first em-

embodiment of a probe for medical use.

Figure 5 also shows the means 4 that provide the probe tube 1 with an elastic memory, located at the tube wall along the length of the tube 1; consisting of a guide thread made from a flexible and radiopaque material 5 that permits the molding of the probe tube 1, the viewing probe in an X-ray photograph and the tracheal intubation without the use of a laryngoscope, and principally in emergencies for intubation, such as CRA (cardio respiratory arrest), polytraumas, facial and cervical injury, urgency tracheostomy, facilitates and expedites greatly the intubation procedure, since it dispenses with the guide and even the laryngoscope, minutes or seconds less, which may represent the patient's life, also preventing the risks of injuries caused by conventional guides and laryngoscope when effected by inexperienced people, such as breaking teeth, laceration of the gums, tongue, oropharynx, perforation of the oropharynx, stomach, trachea, bronchia, larynx, vocal cords and underlying organs such as the aorta.

In addition, the probe embodiment shown in figure 5 further comprises a second conduit 8 and a third conduit 10, located at the tube wall and extending along the length of said tube 1, said second conduit 8 being provided with bores 9 close to one of its ends, linking the interior of the tube with the interior of the second conduit 8, whereas the other end is couplable to an external suction means, and the third conduit 10 being provided with bores 11 close to one of its ends above the tracheal cuff, linking the interior of the third conduit 10 to the external region of the tube 1, while the other end of the third conduit 10 is couplable to an external suction means which may be automatic, continuous, intermittent or manual, effected by the physician himself or paramedical. In this way, the secretions existing inside the tube 1 and in the external region of the tube 1 may be sucked through the second 8 and the third 10 conduits, respectively, thus preventing any obstruction of the passageway for the flow of air that may be caused by the presence of such secretions. The second 8 and third 10 conduits are also connectable to a first 3-way connection means 12, provided with a switch 13 for controlling the

9a

suction of secretions through the second 8 and third 10 conduits 10, said first connection means 12 being coupled to an external suction means. Depending upon the position of the switch 13, either the secretions located inside the tube 1 alone or those located in the external region of the tube 1 alone
5 can be sucked, or the secretions of both the regions can be sucked at the same time.

According to an embodiment of the present invention, the first conduit 5 is connectable to a second 3-way connection means 14, provided with a switch 15 that enables one to control the probe operation mode. In this
10 way, the probe may also be used in the conventional manner, with non-physiological pressure, depending upon the position of the switch 15, the first cuff 3 being inflated, in this case, by inserting a fluid into one of the ways for

the second connection means 14, and remaining permanently inflated, or else with passive inflation of the first cuff 3 at the time of inspiration, with physiological pressure of the airways, the backflow of air and the deflation of the first cuff 3 being prevented by closing the connection means 14. In this way, the first cuff 3 remains permanently inflated, but with the physiological pressure of the airways.

The probe shown in figure 5 is further provided with a second cuff 16 intended for monitoring, located around the first conduit 5, also linked to the interior of the first conduit 5 in the region close to the opening 2 of the tube that receives air insufflation, which is inflated and deflated in conjunction with the first cuff 3. The second cuff 16 monitors the functioning of the first cuff 3 and is only inflated if the first cuff 3 is intact and is one of the elements responsible for the specially non-traumatic nature of this probe, since it is elastic and distensible, prevents, in any circumstance, the occurrence of hyperpressure in the cuffs, thus preventing the risk of ischemia or mechanical trauma of the trachea by the cuff (preventing barotraumas).

Figure 6 is a top view from the section BB' of the probe embodiment illustrated in figure 5. This figure illustrates the first cuff 3, the first conduit 5, the second conduit 8 and the third conduit 10, arranged at the tube wall along the length of the tube.

Figure 7 shows a second cuff 16 similar to the first one 3, which communicates with the first conduit 5 and is inflated and deflated in conjunction with the first cuff 3. The second cuff 16 is located close to the end of the tube where the opening 2 that receives air insufflation is located. The second cuff 16 is inflated and deflated at the same rhythm of the inflation and deflation of the first cuff 3, being used for monitoring the first cuff 3, since its inflation will only occur if the first cuff 3 is intact and functions as a relief valve for pressure peaks, since it is elastic and distensible.

Figure 8 illustrates a fifth embodiment of a probe for medical use, which comprises the same elements and has the same operation mode of the probe embodiment of figure 5, described above. However, in this probe embodiment, the first conduit 5 has a constricting portion 21 outside the tube

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wall, close to the end connected to the second cuff 16. In this way, the length of the first conduit 5 may be adjusted, if it is necessary to cut the probe in order to reduce the dead space or else increase it in order to increase the dead space.

- 5 Figure 9 shows another embodiment of a probe for medical use with the same characteristics of the embodiments described above, but fur-

ther comprising a second tube 17, similar to the first one 1, that is to say, being also provided with at least one opening for receiving air insufflation, and a first cuff arranged around the two tubes 1 and 17 in a region of their external walls, inflatable through a first conduit 18 arranged at the tube wall 17, having
5 an opening into the interior of the first cuff and another opening into the interior of the tube 17, this first conduit extending as far as the inside of the first cuff 3 of the first tube 1. The inflation and deflation of the first cuff of the second tube 17 and of the common tracheal cuff that involves the two tubes occurs in the same way described previously for the first cuff 3 of the first
10 tube 1. This second tube 17 is laterally coupled to the first tube 1 and is shorter than the first tube 1.

The conduits 5 and 18 which communicate the inside of the probe with the cuffs and that carry part of the inspired air to inflate them, should compulsorily show expansion at the rate of about 1/3 of the probe gage, being located at the thickness of the probe wall, so that they will project
15 inwards or outwards. This great gage, quite larger than that of conventional probes, will cause the air-flow resistance to be low and the cuffs to be inflated long before the air reaches the end of the probe, guaranteeing that the trachea will be sealed and preventing waste of the inspired gases. If the gage of these conduits is small, equal to that of conventional probes, the resistance is
20 great and the cuffs will not be inflated and so the whole air inspired will leak around the probe, making it ineffective and inadequate for use.

In addition, the location of the air inlet of these ducts has to be either at the proximal end of the probe or at a Y-connector, never near the
25 cuff, be it tracheal or bronchial, for the following reasons:

a) being distant, the cuff will inflate long before the air inspired reaches the probe tip, thus preventing waste of gas. When the volume of air inspired represents the double volume of air in the cuff, the latter will be filled, and the air has only reached the extent of the probe that holds the same volume, that is to say, never having reached the tip. This is very important, since
30 otherwise the cuff does not inflate sufficiently to seal the trachea and permit ventilation with positive pressure;

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- b) the air inlet of the conduits that communicate with the inside of the probe as cuff may never be at the most distal end of the probe, near the cuff. In this case, the air inspired would reach the tip of the probe at a high speed and, instead of inflating the cuff, the air will suck it by the Venturi effect, drying it even more. The probe would be completely ineffective, since the cuff would not inflate. Moreover, even if the cuff inflated a little, this would be for a short time, since this location and the size of its orifice would be factors that would lead to its obstruction rapidly, as well as to an almost immediate flooding of the cuff chamber by secretions, which would make the probe ineffective;
- c) the angle of attack of the air inlet of the conduit that communicates the cuffs with the tube lumen may never be in the direction contrary to the flow of inspired air, not even at a 90-degree angle. It has to form an obtuse angle with respect to the outer surface of the tube, that is to say, it has to be in the same direction of the inspired air with the legs of the Y. This is fundamental, otherwise the inspired air upon passing through the orifice will generate a Venturi effect, which will aspire the cuff and not inflate it.

- It should be understood that the probe for medical use and its components described above are only a few embodiments that might exist.
- The real scope of the object of the invention is defined in the accompanying claims.

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